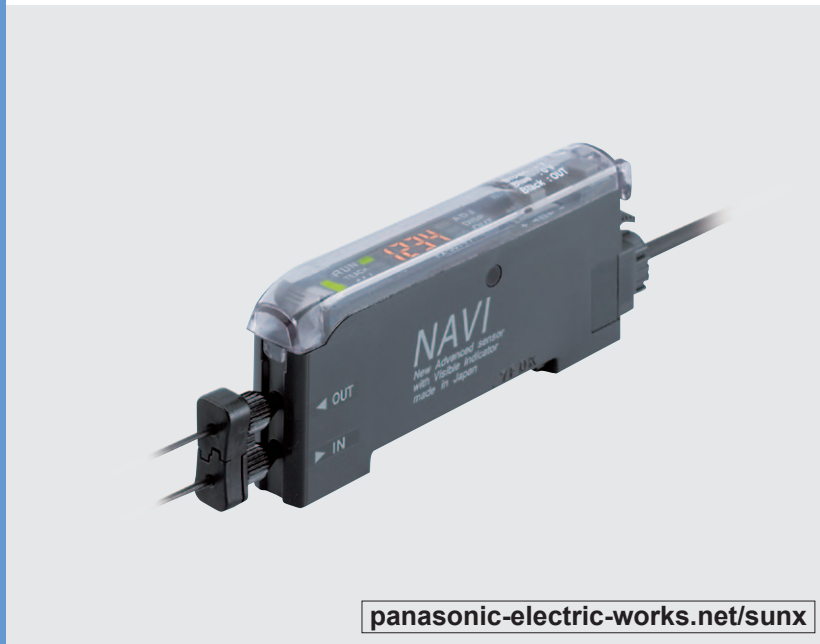


FX-301-F7 FX-301-F

Related Information

- General terms and conditions..... F-17
- Sensor selection guide..... P.3~
- FD-F705 / FT-F902..... P.23~
- Glossary of terms / General precautions...P.1359~ / P.1405



panasonic-electric-works.net/sunx



*** Passed the UL 991 Environment Test**

* UL 61010C-1 compatible, Passed the UL 991 Environment Test based on SEMI S2-0200. [Category applicable for semiconductor manufacturing: TWW2, Process Equipment] [Applicable standards: UL 61010C-1] [Additional test / evaluation standards as per intended use: UL 991, SEMI S2-0200]

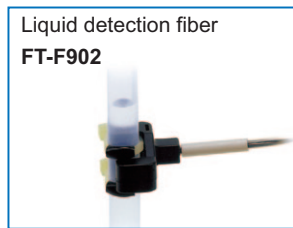


Easy operation even for beginners! Optimum settings can be realized with simple operations

For use with leak detection or liquid detection fiber only

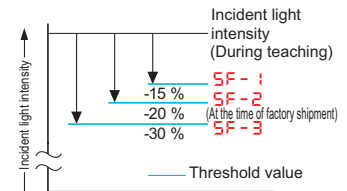
The **FX-301-F7** (Note 1) dedicated for the leak detection fiber **FD-F705** and the **FX-301-F** dedicated for the liquid detection fiber **FT-F902** are available. Optimal setting is possible with easy operation.

Note: The **FX-301-F** can be also used by setting it to leak detection mode. However, the functions are different from the **FX-301-F7** dedicated for the leak detection fiber, so it is recommended to use the **FX-301-F7** when using the leak detection fiber.



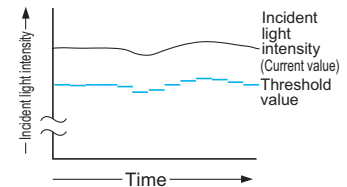
Sets the optimal threshold value **FX-301-F7**

Threshold value will be set automatically to -20 % of the incident light intensity during the teaching to steadily detect the leak. It is also possible to change the threshold value to -15 % or -30 %.



Threshold follow-up function **FX-301-F7**

Entry beam intensity is checked at regular time interval (10 min.), and threshold value is reset automatically.



*Function is set to OFF at the time of factory shipment.

Flashing function incorporated

When the leak detection fiber is connected (F7 mode), if a leak is detected, you will recognize which fiber detects the leak at a single glance because the emitter will start flashing.

Long life and stable operational settings due to the newly developed emitting element

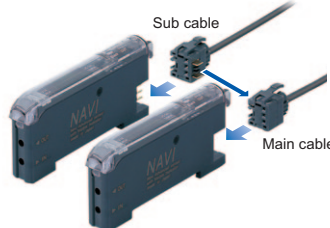
The newly developed "four-chemical emitting element" used for **FX-301-F7/FX-301-F** can suppress the secular change of the light emitting element to minimum, allowing stable detection for long period of time.

Easy maintenance, as main and sub units are identical

Both main and sub units utilize the same amplifier body. This feature allows for easy mounting in the side-by-side configuration.

The main and sub unit functions are distinguished only by the proper use of 3-core main cable and the 1-core sub cable.

Moreover, by utilizing the same body for both main and sub units, inventory management and maintenance is simplified.



- Selection Guide
- Fibers
- Amplifiers

- FX-500
- FX-100
- FX-300
- FX-410
- FX-311

FX-301-F7/
FX-301-F

Easy to operate with individual / collective teaching mode

Individual teaching mode (TEACH)

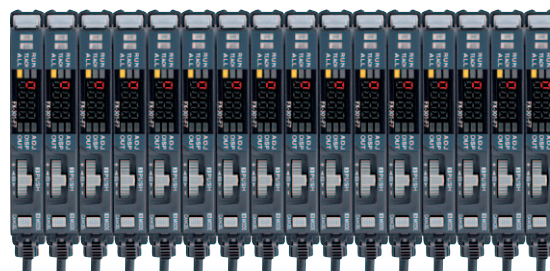
Optimal threshold value is set automatically on **FX-301-F7** just by setting the MODE indicator to "TEACH" and pressing the jog switch.

(The threshold value is set after selecting the liquid detection fiber for **FX-301-F**.)

Collective teaching mode (ALL)

Teaching is performed collectively for all the connected amplifiers with an optical communication function when the MODE indicator is set to "ALL". Each amplifier will be set with an optimal threshold value.

(At the same time, other setting in the master unit will be copied to the slave unit.)



Communication direction
Collective teaching mode is possible for 16 units max.

LEAK DETECTION FIBER (FD-F705)

Low profile liquid detection fiber with high chemical resistance

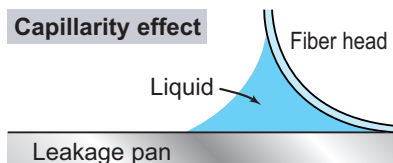
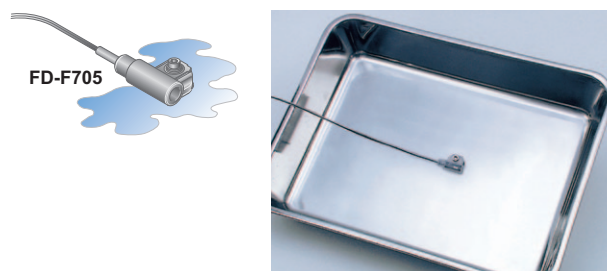


SEMI S2 compliant!

Leak detection fiber cannot be used in combination with the **FX-100/300/311/411** series.

Stable detection performance

The unique effect of capillarity enables reliable detection of small leaks and viscous liquids.



Compact, space-saving

This slim (10 mm 0.394 in) side-mounting fiber head is especially good for use in confined spaces.

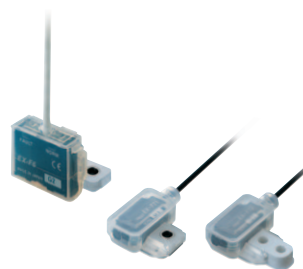
Labor-saving design

- Because all you need to install is one screw, one-touch mounting of the fiber head is possible.
- Replacement parts even for resetting after a leak are unnecessary.
- Because the fiber head is simply designed, wiping off leaks is rendered easy.

Superb explosion resistance / chemical resistance

Explosion resistance is enhanced by adopting the fiber method (SEMI S2 compliant). The head unit made of fluorocarbon polymers also has superb chemical resistance.

Amplifier built-in type photoelectric sensor is also line-up **EX-F70 / EX-F60**



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**FX-301-F7/
FX-301-F**

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LIQUID DETECTION FIBER (PIPE-MOUNTABLE) (FT-F902)

Stably detect the liquid inside the pipe!



SEMI S2 compliant!

Leak detection fiber cannot be used in combination with the FX-100/300/311/411 series.

Superior explosion resistance compatible to SEMI S2

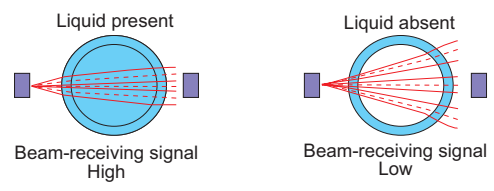
Because there is no electric circuitry in the fiber head, it boasts excellent explosion resistance.

Easy to use and reliable detection

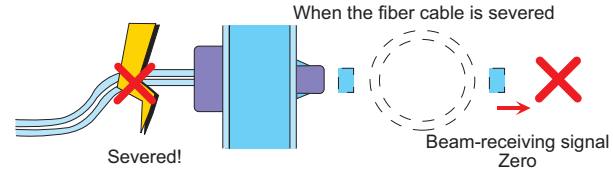
Even when the shape and thickness of the pipe vary, this fiber head uses a method where the beam axis follows the diameter of the pipe, and so when compared to conventional methods, the shape and thickness of the pipe have no influence over the performance of this fiber head.

Stable design that doesn't permit liquid-absent or sensor errors

• When liquid is present, its effect on the lens causes light to focus and enter.



• When abnormalities such as a severed or removed fiber or a cutoff cable occur, light does not enter and the sensor will output the same as "liquid-absent".



Reliable detection not affected by bubbles or droplets

Latest optical fiber techniques have solved problems caused by bubbles, droplets or liquid leakage that arise in conventional pipe-mountable fiber heads.

ORDER GUIDE

Amplifiers Quick-connection cable is not supplied with the amplifier. Please order it separately.

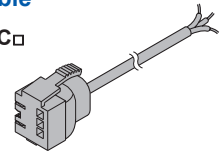
Type		Appearance	Model No.	Emitting element	Output
Leak detection fiber only	NPN output		FX-301-F7	Red LED	NPN open-collector transistor
	PNP output		FX-301P-F7		PNP open-collector transistor
Liquid detection fiber only	NPN output		FX-301-F	Red LED	NPN open-collector transistor
	PNP output		FX-301P-F		PNP open-collector transistor

Quick-connection cables Quick-connection cable is not supplied with the amplifier. Please order it separately.

Type	Model No.	Description	
Main cable (3-core)	CN-73-C1	Length: 1 m 3.281 ft	0.15 mm ² 3-core cabtyre cable, with connector on one end Cable outer diameter: ø3.0 mm ø0.118 in
	CN-73-C2	Length: 2 m 6.562 ft	
	CN-73-C5	Length: 5 m 16.404 ft	
Sub cable (1-core)	CN-71-C1	Length: 1 m 3.281 ft	0.15 mm ² 1-core cabtyre cable, with connector on one end Cable outer diameter: ø3.0 mm ø0.118 in
	CN-71-C2	Length: 2 m 6.562 ft	
	CN-71-C5	Length: 5 m 16.404 ft	

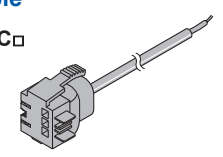
Main cable

• **CN-73-C□**



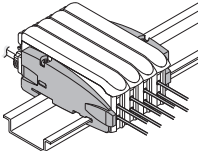
Sub cable

• **CN-71-C□**

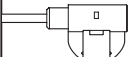
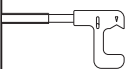


ORDER GUIDE

End plates End plates are not supplied with the amplifier. Please order it separately when the amplifiers are mounted in cascade.

Appearance	Model No.	Description
	MS-DIN-E	When cascading multiple amplifiers, or when it moves depending on the way it is installed on a DIN rail, these end plates clamp amplifiers into place on both sides. Make sure to use end plates when cascading multiple amplifiers together. Two pcs. per set

Fiber heads

Designation	Appearance	Description (Note 3)	Sensing object	Fiber cable length Free-cut	Bending radius (mm in)	Model No.
Leak detection fiber		—	Liquid (Note 1)	5m 16.405 ft (Protective tube: 3m 9.843 ft)	Protective tube R20 R0.787 Fiber R4 R0.157	FD-F705
Liquid detection fiber		Applicable pipe diameter: Outer dia. $\phi 3$ to $\phi 10$ mm $\phi 0.118$ to $\phi 0.394$ in Transparent pipe (Note 3) [PFA (fluorine resin) or equivalently transparent pipe, wall thickness 0.3 to 1.0 mm 0.012 to 0.039 in]	Liquid (Note 2)	2m 6.562 ft	Protective tube R20 R0.787 Fiber R4 R0.157	FT-F902

- Notes: 1) Highly viscous liquid may not be detected stably.
 2) Reliable detection may not be possible for unclear or heavily colored liquid.
 3) Liquid in an opaque pipe cannot be detected correctly.
 4) **FD-F707** has changed the model name. **FD-F707** → **FD-F7-M7T** **FT-F905** has changed the model name. **FT-F905** → **FT-F9-M5T3T**

About the handling of the fiber length changed product

The type with fiber length changed is prepared as a semi-custom product with fast response.

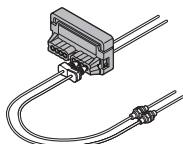
Please contact the sales regarding the model name, standard price, and delivery.

- Fiber length extension: Up to 30 m 98.43 ft, in 1 m 3.281 ft intervals.
- Protection tube length extension: Up to 10 m 32.81 ft, in 0.5 m 1.641 ft intervals.

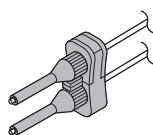
Accessories

- FX-CT2** (Fiber cutter)
- FX-AT4** (Attachment for $\phi 1$ mm $\phi 0.039$ in fiber)
- MS-FD-F7-1** (SUS mounting bracket for **FD-F705** fiber)
- MS-FD-F7-2** (PVC mounting bracket for **FD-F705**)

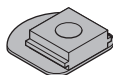
• **FX-CT2**



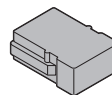
• **FX-AT4**



• **MS-FD-F7-1**
(SUS mounting bracket for **FD-F705**)



• **MS-FD-F7-2**
(PVC mounting bracket for **FD-F705**)

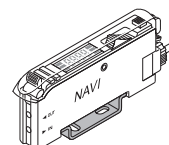


OPTIONS

Designation	Model No.	Description
Amplifier mounting bracket	MS-DIN-2	Mounting bracket for amplifier
Fiber sensor amplifier protection seal	FX-MB1	10 sets of 2 communication window seals and 1 connector seal Communication window seal: It prevents malfunction due to transmission signal from another amplifier, as well as, prevents effect on another amplifier. Connector seal: It prevents contact of any metal, etc., with the pins of the quick-connection cable.

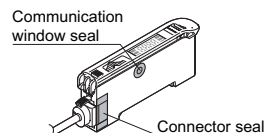
Amplifier mounting bracket

- **MS-DIN-2**



Fiber sensor amplifier protection seal

- **FX-MB1**



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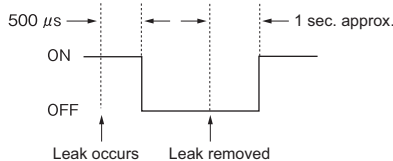
FX-301-F7/ FX-301-F

SPECIFICATIONS

Amplifiers

Item	Model No.	Type	For leak detection fiber	For liquid detection fiber
		NPN output	FX-301-F7	FX-301-F
		PNP output	FX-301P-F7	FX-301P-F
Applicable fibers			FD-F705	FT-F902
Supply voltage			12 to 24 V DC ±10 % Ripple P-P 10 % or less	
Power consumption			Normal operation: 960 mW or less (Current consumption 40 mA or less at 24 V supply voltage) ECO mode: 600 mW or less (Current consumption 25 mA or less at 24 V supply voltage)	
Output		NPN open-collector transistor	PNP open-collector transistor	
		<ul style="list-style-type: none"> Maximum sink current: 100 mA (50 mA, if five, or more, amplifiers are connected in cascade.) Applied voltage: 30 V DC or less (between output and 0 V) Residual voltage: 1.5 V or less [at 100 mA (50 mA, if five, or more, amplifiers are connected in cascade.) sink current] 	<ul style="list-style-type: none"> Maximum source current: 100 mA (50 mA, if five, or more, amplifiers are connected in cascade.) Applied voltage: 30 V DC or less (between output and +V) Residual voltage: 1.5 V or less [at 100 mA (50 mA, if five, or more, amplifiers are connected in cascade.) source current] 	
	Output operation		OFF when leak is detected	Liquid setting (F9 mode): Using the jog switch, choose the signal OFF condition between absence of liquid and presence of liquid. Leak setting (F7 mode): OFF with detection of leak
	Short-circuit protection		Incorporated	
Response time			500 μs or less (Note 2)	250 μs or less (Note 2)
Sensitivity setting			Individual teaching / Collective teaching	
Operation indicator			Orange LED (lights up when the output is ON)	
Automatic follow-up function indicator			Green LED (lights up when automatic follow-up function is ON.)	_____
Model indicator			_____	Green LED [lights up during liquid setting (F9 mode)]
MODE indicator			RUN: Green LED, TEACH • ALL • ADJ • DISP • OUT: Yellow LED	
Digital display			4 digit red LED display	
Fine sensitivity adjustment function			Incorporated	
Timer function			_____	Delay timer [used only for liquid setting (F9 mode)] (Timer setting selectable from 10 ms, 100 ms, 1,000 ms, and none)
Environmental resistance	Ambient temperature		0 to +50 °C +32 to +122 °F (If 8 to 16 units are connected in cascade: 0 to +45 °C +32 to +113 °F) (No dew condensation), Storage: -20 to +70 °C -4 to +158 °F	
	Ambient humidity		35 to 85 % RH, Storage: 35 to 85 % RH	
	Ambient illuminance		Incandescent light: 3,000 lx at the light-receiving face	
	Voltage withstandability		1,000 V AC for one min. between all supply terminals connected together and enclosure (Note 3)	
	Insulation resistance		20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure (Note 3)	
	Vibration resistance		10 to 150 Hz frequency, 0.75 mm 0.030 in amplitude in X, Y and Z directions for two hours each	
	Shock resistance		98 m/s ² acceleration (10 G approx.) in X, Y and Z directions for five times each	
Emitting element			Red LED (Peak emission wavelength: 650 nm 0.026 mil, modulated)	
Material			Enclosure: Heat-resistant ABS, Case cover: Polycarbonate, Switch: Acrylic	
Connecting method			Connector (Note 4)	
Cable length			Total length up to 100 m 328.084 ft is possible with 0.3 mm ² , or more, cable.	
Weight			Net weight: 20 g approx, Gross weight: 35 g approx.	

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.
2) When detecting leak (output OFF) during leak setting (F7 mode), since the sensor flashes the emitted light, only the response action for turning the signal back to ON is delayed (1 sec. approx.).



3) The voltage withstandability and the insulation resistance values given in the above table are for the amplifier only.
4) The cable for amplifier connection is not supplied as an accessory. Make sure to use the optional quick-connection cable given below.
Main cable (3-core): **CN-73-C1** (cable length 1 m 3.281 ft), **CN-73-C2** (cable length 2 m 6.562 ft), **CN-73-C5** (cable length 5 m 16.404 ft)
Sub cable (1-core): **CN-71-C1** (cable length 1 m 3.281 ft), **CN-71-C2** (cable length 2 m 6.562 ft), **CN-71-C5** (cable length 5 m 16.404 ft)

SPECIFICATIONS

Leak detection fiber

Model No.		FD-F705
Item		
Applicable amplifiers		FX-301-F7, FX-301P-F7
Sensing object		Liquid (Note 2)
Fiber cable length		5 m 16.405 ft (Free-cut)
Protective tube length		3 m 9.843 ft
Allowable bending radius		Protective tube: R20 mm R0.787 in or more, Fiber cable: R4 mm R0.157 in or more
Bending durability		Fiber cable: 1,000,000 times or more (at R4 mm R0.157 in)
Emitting indicator		Incorporated
Peel strength		19.6N or less (PFA protective tube)
Ambient temperature		-20 to +50 °C -4 to +122 °F (No dew condensation or icing allowed) (Note 3), Storage: -20 to +50 °C -4 to +122 °F
Ambient humidity		35 to 85 % RH, Storage: 35 to 85 % RH
Material	Fiber cable	Fiber core: Acrylic, Fiber sheath: Vinyl chloride, Protective tube: Fluorine resin (PFA)
	Fiber head	Outer casing: Fluorine resin (PFA), Interior: Heat-resistant ABS, Acrylic
Accessories		MS-FD-F7-1 (SUS mounting bracket): 1 pc., MS-FD-F7-2 (PVC mounting bracket): 1 pc., FX-CT2 (Fiber cutter): 1 pc., FX-AT4 (ø1 mm ø0.039 in fiber attachment): 1 set for emitter and receiver (Note 4)

- Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C **+73.4 °F**.
 2) Highly viscous liquid may not be detected stably.
 3) Liquid being detected should also be kept within the rated ambient temperature range.
 4) One for the **FX-301-F7/F** and one for the **FX-D1-F** come with the **FX-AT4**.

Liquid detection fiber

Model No.		FT-F902
Item		
Applicable amplifiers		FX-301-F, FX-301P-F
Sensing object		Liquid (Note 2)
Applicable pipe diameter (Note 3)		Outer dia ø3.0 to ø10.0 mm ø0.118 to ø0.394 in (PFA (fluorine resin) or equivalently transparent pipe, wall thickness 0.3 to 1.0 mm 0.012 to 0.039 in)
Fiber cable length		2 m 6.562 ft (Free-cut)
Protective tube length		1 m 3.281 ft
Allowable bending radius		Protective tube: R20 mm R0.787 in or more, Fiber cable: R4 mm R0.157 in or more
Bending durability		Fiber cable: 1,000,000 times or more (at R4 mm R0.157 in)
Ambient temperature (Note 4)		-20 to +60 °C -4 to +140 °F (No dew condensation or icing allowed) (Note 4), Storage: -20 to +60 °C -4 to +140 °F
Ambient humidity		35 to 85 % RH, Storage: 35 to 85 % RH
Material	Fiber cable	Fiber core: Acrylic, Fiber sheath: Vinyl chloride, Protective tube: Fluorine resin (PFA)
	Fiber head	Enclosure: Heat-resistant ABS, Lens: Acrylic
Accessories		Tying band: 2 Nos., Anti-slip tube: 2 Nos., FX-CT2 (Fiber cutter): 1 No., FX-AT4 (ø1 mm ø0.039 in fiber attachment): 1 set for emitter and receiver (Note 5)

- Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C **+73.4 °F**.
 2) Reliable detection may not be possible for unclear or heavily colored liquid.
 3) Liquid in an opaque pipe cannot be detected correctly.
 4) Liquid being detected should also be kept within the rated ambient temperature range.
 5) One for the **FX-301-F7/F** and one for the **FX-D1-F** come with the **FX-AT4**.

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**FX-301-F7/
FX-301-F**

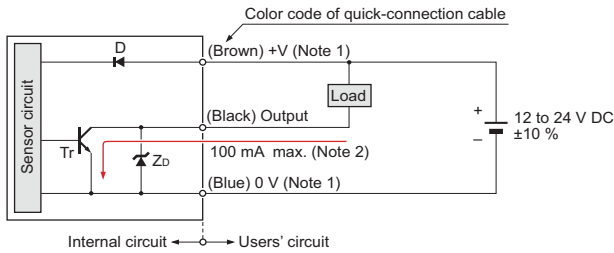
- FIBER SENSORS
- LASER SENSORS
- PHOTO-ELECTRIC SENSORS
- MICRO PHOTO-ELECTRIC SENSORS
- AREA SENSORS
- LIGHT CURTAINS
- PRESSURE / FLOW SENSORS
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I/O CIRCUIT AND WIRING DIAGRAMS

FX-301-F7 FX-301-F

NPN output type

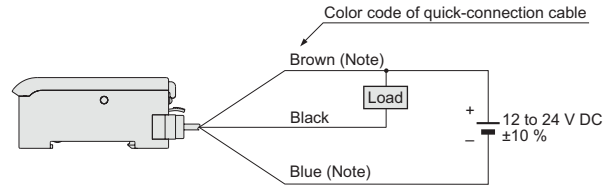
I/O circuit diagram



- Notes: 1) The quick-connection sub cable does not have +V (brown) and 0 V (blue). The power is supplied from the connector of the main cable.
 2) 50 mA max., if five amplifiers, or more, are connected in cascade.
 3) Never connect several amplifiers in series (AND).

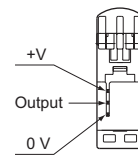
Symbols ... D : Reverse supply polarity protection diode
 Zd: Surge absorption zener diode
 Tr : NPN output transistor

Wiring diagram



Note: The quick-connection sub cable does not have brown lead wire and blue lead wire. The power is supplied from the connector of the main cable.

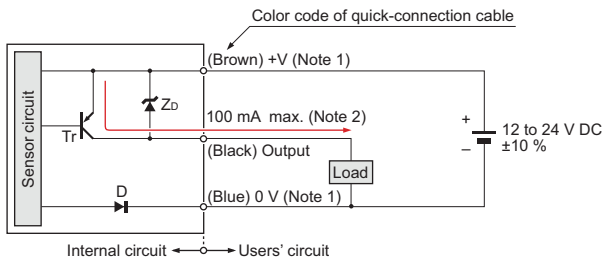
Terminal arrangement diagram



FX-301P-F7 FX-301P-F

PNP output type

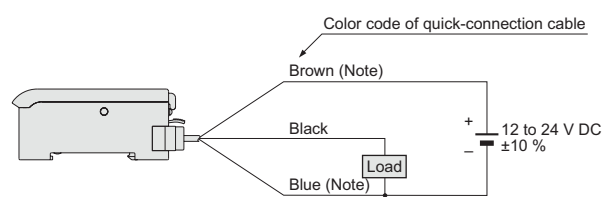
I/O circuit diagram



- Notes: 1) The quick-connection sub cable does not have +V (brown) and 0 V (blue). The power is supplied from the connector of the main cable.
 2) 50 mA max., if five amplifiers, or more, are connected in cascade.
 3) Never connect several amplifiers in series (AND).

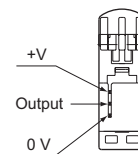
Symbols ... D : Reverse supply polarity protection diode
 Zd: Surge absorption zener diode
 Tr : PNP output transistor

Wiring diagram



Note: The quick-connection sub cable does not have brown lead wire and blue lead wire. The power is supplied from the connector of the main cable.

Terminal arrangement diagram



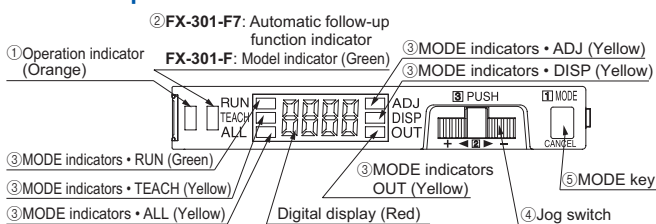
PRECAUTIONS FOR PROPER USE

Refer to General precautions.



- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

Part description



- ① Operation indicator (Orange)... Lights up when output is ON.
- ② **FX-301-F7**: Automatic follow-up function indicator (Green)... Lights up when automatic follow-up function is ON.
FX-301-F: Model indicator (Green)... Lights up during liquid setting (F9 mode).
- ③ MODE indicators...
 RUN (Green): Lights up during normal sensing operation.
 TEACH (Yellow): Lights up when the individual teaching mode is selected.

- ALL (Yellow): Lights up when the collective teaching mode is selected.
- ADJ (Yellow): Lights up when the threshold value fine adjustment mode is selected or the sensitivity switching function is activated.
- DISP (Yellow): Lights up when the digital display setting mode is selected or the timer function (**FX-301-F** only) is activated.
- OUT (Yellow): Lights up when the forced output mode is selected or the NO / NC switching function is activated.
- ④ Jog switch... Moving this switch in the "+" or "-" direction, allows different items to be viewed for selection and pressing the switch then confirms the selected setting.
- ⑤ MODE key... This key is used to select operating modes and to cancel settings during the configuration process.

- FX-500
- FX-100
- FX-300
- FX-410
- FX-311
- FX-301-F7 / FX-301-F

PRECAUTIONS FOR PROPER USE

Refer to General precautions.

Setting items

RUN Run Normal sensing condition	TEACH Teaching Mode for teaching with one unit	ALL All Mode for teaching 2 or more units collectively
OUT Out Mode for turning the forced output ON or OFF regardless of the incident light intensity NO and NC can be selected (FX-301-F only)	DISP Display Mode for shifting the digital display and switching to ECO mode Timer can be set (FX-301-F only)	ADJ Adjust Fine-adjusts the threshold value Low, high, or automatic sensitivity can be selected

Individual teaching mode

- The sensitivity selection function is set to the automatic sensitivity setting (Auto) at the time of factory shipment. In case sensitivity selection setting is done, make sure to carry out "teaching" after the sensitivity selection setting.

- When MODE indicator / TEACH (yellow) lights up, threshold value can be set on a single unit.

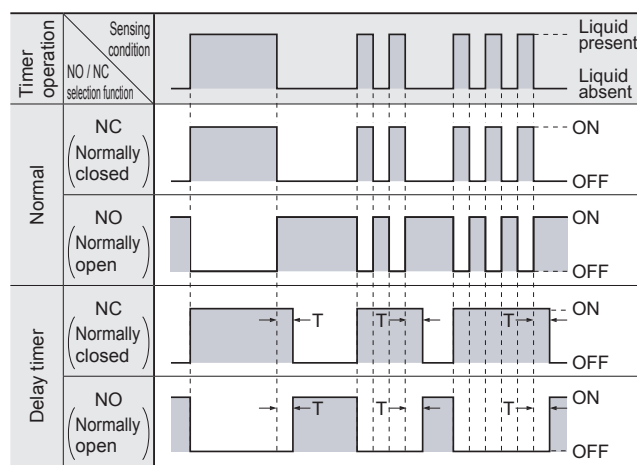
Step	Description	Display
①	Insert Leak detection fiber (FD-F705) or Liquid detection fiber (FT-F902). Press MODE key to light up MODE indicator / TEACH (yellow).	1234
②	<FX-301-F7> Shift amount of the threshold value can be changed by turning Jog switch to "+" or "-" side. While changing, the digital display (red) blinks. 5F-1: Shift approx. 15 % 5F-2: Shift approx. 20 % (At factory setting) 5F-3: Shift approx. 30 % <FX-301-F> Turn the jog switch to "+" or "-" side to set to Liquid (F9) mode (-F9-). (Note 1) In case Liquid (F9) mode(-F9-) is set, the model indicator (Green) lights up.	5F-2 -F9-
③	Press Jog switch in no-leak condition or no-liquid condition. Press Jog switch to start teaching.	0000
④	When teaching is accepted, the result of threshold value setting is displayed. • In case stable sensing is possible: "Good" on the display blinks three times. • In case stable sensing is not possible: "Er-3" on the display blinks. <FX-301-F7> The shift amount set in the ② will revert to the first shift amount before setting.	Good Er-3
⑤	If the teaching result is "Good", the sensor returns to RUN mode automatically and the incident light intensity is shown on the display. MODE indicator / RUN (green) lights up. The setting is complete.	1234

Notes: 1) The FX-301-F's initial setting at the time of factory shipment is Liquid (F9) mode (-F9-).
2) Do not move or bend the fiber cable after the sensitivity setting. Detection may become unstable.

Timer function (FX-301-F only)

- This product incorporates a delay timer which reduces the effect of air bubbles, etc.
- The timer setting can be done by pressing the jog switch for 3 sec., or more, when Liquid (F9) mode (-F9-) has been set and MODE indicator / DISP (yellow) lights up. In case of Leak (F7) mode (-F7-), the display does not change to the timer function.

Time chart



Timer period: T = 10 ms, 100 ms, 1,000 ms

Wiring

- Wiring tasks and expansion tasks must be performed with the power off.
- Verify that the supply voltage variation is within the rating.
- Take care that if a voltage exceeding the rated range is applied, or if an AC power supply is directly connected, the product may get burnt or damaged.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this product, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- Make sure to use an isolation transformer for the DC power supply. If an autotransformer (single winding transformer) is used, this product or the power supply may get damaged.
- When a surge occurs in the power used, absorb the surge with a surge absorber connected to the power source.
- Take care that short circuit of the load wrong wiring may burn or damage the product.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.
- Make sure to use the optional quick-connection cable for the connection of the amplifier. Extension up to total 100 m 328.084 ft is possible with 0.3 mm², or more, cable. However, in order to reduce noise, make the wiring as short as possible.

Others

- Do not use during the initial transient time (0.5 sec. approx.) after the power supply is switched on.
- Take care that the sensor is not directly exposed to fluorescent lamp from a rapid-starter lamp, a high frequency lighting device or sunlight etc., as it may affect the sensing performance.
- Do not use this sensor in places having excessive vapor, dust, etc., or where it may come in contact with corrosive gas.
- When the fiber head gets dusty or dirty etc. the sensitivity deteriorates. To keep stable detection, wipe the fiber head to remove dust or dirt etc. and carry out sensitivity teaching periodically.
- These sensors are only for indoor use.
- Take care that the product does not come in contact with oil, grease, organic solvents, such as thinner, etc., strong acid or alkaline.
- This sensor cannot be used in an environment containing inflammable or explosive gases.
- Never disassemble or modify the sensor.
- EEPROM is adopted to this product. It is not possible to conduct teaching 100 thousand times or more, because of the EEPROM's lifetime.

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FX-311

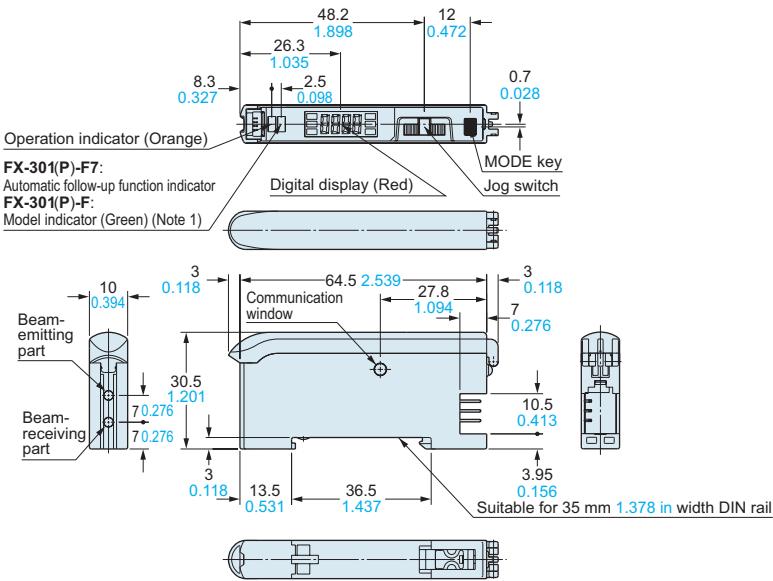
FX-301-F7/
FX-301-F

DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from our website.

FX-301(P)-F7 FX-301(P)-F

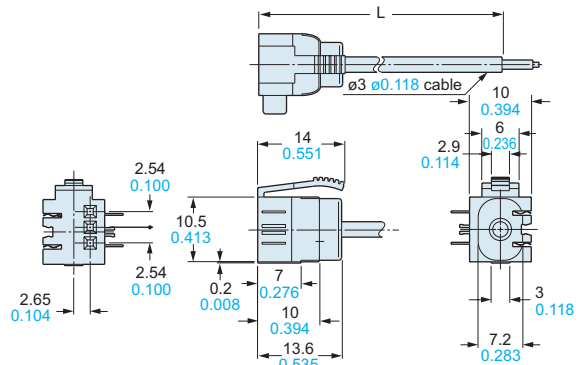
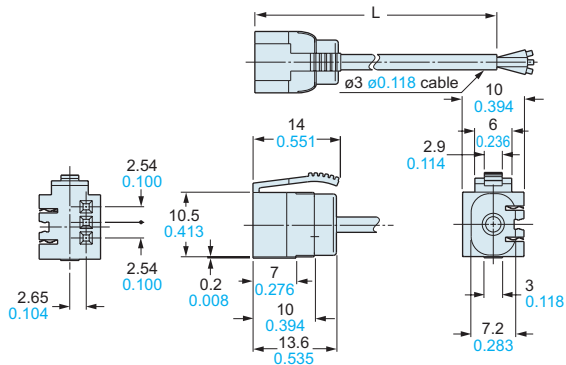
Amplifier



Note: Above figure is an external dimension drawing of the FX-301(P)-F7. Shape of the indicator for FX-301(P)-F is little different.

CN-73-C1 CN-73-C2 CN-73-C5 Main cable (Optional)

CN-71-C1 CN-71-C2 CN-71-C5 Sub cable (Optional)



• Length L

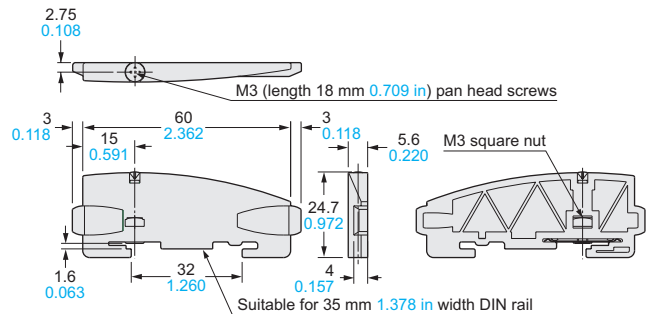
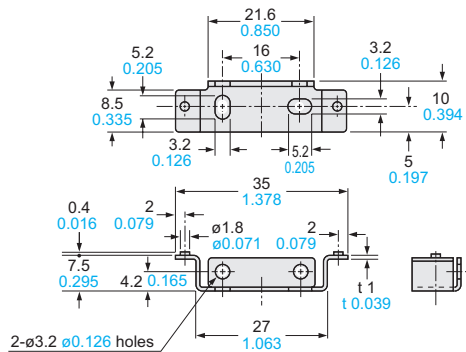
Model No.	Length L
CN-73-C1	1,000 39.390
CN-73-C2	2,000 78.740
CN-73-C5	5,000 196.850

• Length L

Model No.	Length L
CN-71-C1	1,000 39.390
CN-71-C2	2,000 78.740
CN-71-C5	5,000 196.850

MS-DIN-2 Amplifier mounting bracket (Optional)

MS-DIN-E End plates (Optional)



Material: Cold rolled carbon steel (SPCC)
(Uni-chrome plated)

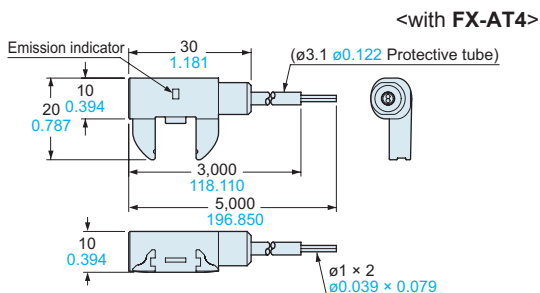
Material: Polycarbonate

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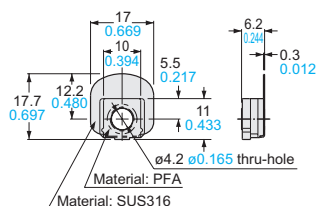
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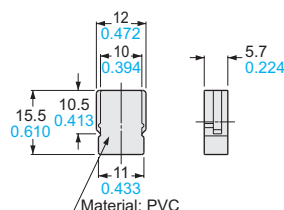
FD-F705 ✂ Free cut



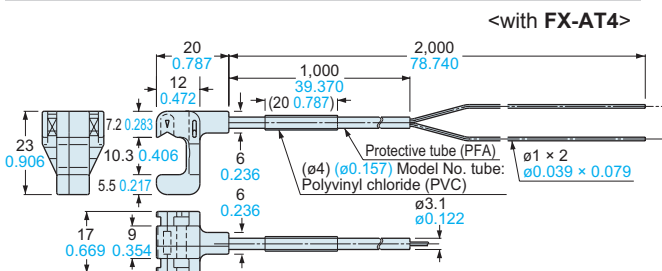
MS-FD-F7-1 SUS mounting bracket for FD-F705 (Accessory)



MS-FD-F7-2 PVC mounting bracket for FD-F705 (Accessory)



FT-F902 ✂ Free cut



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